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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/089,985	Applicant(s) LAITINEN-VELLONEN, SAKARI	
	Examiner Kaj K. Olsen	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
 4a) Of the above claim(s) 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18,20,21 and 24 is/are rejected.
- 7) ☒ Claim(s) 19,22,23,25 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 14-17 remain withdrawn from further consideration as being drawn to a non-elected invention.

Specification

2. The disclosure is objected to because of the following informalities: In the beginning of the specification, applicant should specify that this application is a U.S. national stage entry of the international application.

Claim Rejections - 35 USC § 112

3. The examiner has withdrawn the previous 35 U.S.C. 112, first paragraph rejections in view of the arguments by the applicant. The examiner has withdrawn the previous 35 U.S.C. 112, second paragraph rejections in view of the amendments to the claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glass et al (USP 5,120,421) in view of Liu (USP 4,655,880).

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6. Glass discloses an electrochemical sensor for analyzing a liquid that comprises at least five series of working electrodes 200 and counter electrodes 206. See fig. 12 and col. 9, ll. 40-65. With respect to each series comprising a reference electrode as well, Glass discloses earlier that the counter electrode can be utilized alone or in conjunction with a reference electrode. See col. 8, line 38-41. Hence Glass recognized that both two and three electrode configurations are known in the art. Although Glass never explicitly stated that discussion at col. 8 could be utilized for the embodiment described in col. 9, one possessing ordinary skill in the art would have recognized based on Glass's discussion that a three electrode configuration of the fig. 12 embodiment would have required only routine skill in the art. With respect to the claimed common bias electrode, any of the additional reference or counter electrodes 206 not counted as part of the various series would have read on this additional electrode. With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. Glass discloses the use of a potentiostat for analyzing the electrode response, but does not explicitly identify the use of a pre amplifier to amplify these various electrode signals. Liu teaches in an alternate sensor that potentiostat circuits comprise the amplification of the working electrode signals. See fig. 1 and col. 6, ll. 24-37. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to amplify the electrode signals such that their current responses can be more readily monitored. With respect to the amplifier being a "pre-amplifier", the examiner is not aware of any fundamental distinction between an amplifier and a

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pre-amplifier and the amplifier of Liu would read on the claimed pre-amplifier of the instant invention.

7. With respect to the electrode materials, see Glass, col. 8, ll. 54-63.

8. With respect to the pre-amplifiers being in the immediate vicinity to the electrodes, absent an explicit definition of what constitutes an immediate vicinity, the location shown by Liu would meet this limitation. Alternatively, it is well known that the longer one delays amplifying a small measurement signal, the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

9. Claims 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winqvist et al (Meas. Sci. Technol., 9, pp. 1937-1946, 1998) in view of Liu.

10. Winqvist discloses an electrochemical sensor comprising at least six working electrodes as well as a counter and reference electrode. See fig. 1 and section 3.2. Claim 18 differs from the teaching of Winqvist by setting forth that each cell comprises a counter and reference electrode. However, it is well known in the art that a plurality of working electrodes can be provided with a single reference and counter electrode for all the working electrodes or each be provided with its own reference and counter electrode. This is demonstrated by the teaching of Liu where there are embodiments that utilize only a single reference and counter electrode for all the working electrodes (fig. 6) like Winqvist, or utilize a counter and reference electrode for each working electrode (fig. 1 and 5). See col. 2, ll. 41-51. The use of a plurality of reference and counter electrodes (albeit more complex) would give an operator the flexibility to operate the

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various working electrodes in a more independent manner providing an operator with greater flexibility. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Liu and provide separate reference and counter electrodes for each working electrode for the sensor of Winqvist in order to provide the operator with greater flexibility in operating the working electrodes. With respect to the presence of a common-bias electrode, any of the additional reference or counter electrodes not counted as part of the various series would have read on this additional electrode. With respect to the electrode being for the establishment of a common-bias, there is no claimed structure explicitly drawn to the use of this electrode as being for establishing a common bias. Hence the use of the electrode as a common bias electrode constitutes the intended use of the apparatus and the intended use need not be given further due consideration in determining patentability. With respect to the measurement cell, the beaker of fig. 1 of Winqvist would read on the defined measurement cell. With respect to the presence of a pre-amplifier, Winqvist (like Glass previously) did not explicitly recite the use of an amplifier as part of the potentiostat. However, Liu also discloses the presence of such an amplifier as part of the conventional potentiostat. See fig. 1 and col. 6, ll. 24-37. With respect to the electrode materials, see section 3.2 of Winqvist.

11. With respect to the pre amplifier being in the immediate vicinity, again absent an explicit definition of what constitutes an immediate vicinity, the vicinity shown by Liu would meet this limitation. Alternatively, it is well known that the longer one delays amplifying a small measurement signal, the more corrupted the measurement signal can get. Hence one possessing ordinary skill in the art would have been motivated to move the amplifier of Liu to the

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immediate vicinity of the electrodes to prevent undesirable signal degradation. In addition, see the alternative rejection below.

12. Claim 21 is rejected in the alternative under 35 U.S.C. 103(a) as being unpatentable over either Glass or Winqvist in view of Liu as applied to claim 18 above, and further in view of Toxic Gas CiTiceLs (hereafter "Citicels"). Citicels is a manual for the products of City Technology Ltd that was provided to the examiner on a communication dated 7-30-1999. Hence the reference was published on or before 7-30-1999.

13. If the conventional spacing in the art (and as shown by either Glass or Winqvist in view of Liu) is not construed as reading on the claimed proximate location, Citicels teaches an embodiment that amplifiers can be placed on a circuit board mounted right below a sensor in order to amplify the signal. See fig. 17 (the second of two figures labeled "17") and 18 and p. 29. This configuration would prevent a microamp level signal from being corrupted by long transmittal lengths. In addition, said configuration allows the sensor to have its calibration being programmed in at the source of the sensor. See p. 29. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Citicels for the sensor of either Glass or Winqvist in view of Liu in order to prevent the signal from being corrupted and to provide the calibration at the source of the sensor.

14. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Glass or Winqvist in view of Liu as applied to claim 18 above, and further in view of Goerg et al (USP 3,616,272).

15. The references set forth all the limitations of the claim, but did not specify the presence of any sensor pipes. However, the use of pipes to deliver fluid to an electrochemical sensor is

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well known in the art. In particular, Goerg shows such a configuration that utilizes pipes to provide sample to a sensor and discharges said fluid allowing continuous measurements. See fig. 1 and col. 1, ll. 3-21. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Goerg for the sensor of either Glass or Winqvist in view of Liu in order to allow for continuous measurements. With respect to the claimed arrangement for the pipes (see 112 first paragraph rejection above), the structure of Goerg would be capable allowing fluid to remain around the sensor at all times (for example, by closing valves 4 and 8). Whether or not the references disclosed doing so only constitutes the intended use of the sensor pipes and the intended use need not be given further due consideration in determining patentability.

Allowable Subject Matter

16. Claims 19, 22, 23, 25 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. With respect to claim 19, the prior art does not disclose nor render obvious all the limitations of claim 18 and further comprising the specified measurement channels branching out radially of an intake channel with the common-bias electrode in the center of the intake channel.

Claims 22, 23, 25 and 26 all depend from claim 19.

Response to Arguments

18. Applicant's arguments filed 3-31-2005 have been fully considered but they are not persuasive. With respect to the rejection of the claims over Glass and Liu, applicant urges that Glass does not disclose "*independent* series of three or even two electrodes" (emphasis added by examiner). Applicant here appears to be alluding to the fact that Glass utilizes an array of interconnected counter (i.e. auxiliary) electrodes and wouldn't be capable of providing independent measurements with each set of working, counter and reference electrodes. First, this distinction is not being claimed away from the teachings of Glass in view of Liu. The word "independent" never appears in the claimed invention. In particular, the claims call for at least 4 series of working counter and reference electrodes with at least one additional "common-bias" electrode. The claims never require each of those electrodes in each of those series be independently addressable. Furthermore, even if the claims did include that distinction, operating the various electrodes in such a manner is only the intended use of those electrodes. Whether the electrodes are being operated as a number of different series (as the applicant does) or whether they are being treated as interconnected electrode series entirely depends on how one addresses those electrodes during the operation of the sensor. These different operational means would not constitute a distinction for the claimed electrode structure itself though. Second, even if the examiner was of the opinion that applicant has claimed the sensor in a manner that reads free of the interconnected auxiliary electrode of Glass, Liu taught that counter electrodes need not be interconnected, but can be separately provided. See fig. 1; col. 6, ll. 38-48 and col. 7, ll. 34-44. It would have been obvious to one of ordinary skill in the art at the time the invention

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was being made to utilize this teaching of Liu for the sensor of Glass so as to increase the operational flexibility of the sensor. See the rejection of Winqvist in view of Liu above.

19. Applicant also urges that these teachings fail to teach a “common-bias electrode”.

However, the examiner dealt with the applicant’s use of this term in the previous office action.

See p. 7, ll. 1-5. To reiterate, whether one utilizes any of the additional electrodes of Glass for a common-bias electrode constitutes how that electrode is being utilized and intended use need not be given further due consideration. Whether or not the additional electrode of Glass can be “shared” by the other electrode series does not alter the fact that Glass has an additional electrode that reads on the defined structure of the common-bias electrode of Glass.

20. With respect to the rejection over Winqvist and Liu, applicant’s arguments appear to mirror the common-bias argument made with respect to Glass and Liu. Because the examiner addressed this issue in the preceding paragraph and on p. 8, l. 22 through p. 9, l. 7 of the previous office action, this argument will not be reiterated here.

21. Applicant’s arguments for the use of Citicels and Goerg appear to rely on the applicant’s perceived failings of Glass or Winqvist in view of Liu with respect to claim 18. Because these arguments weren’t persuasive (see above), these rejections are also being maintained.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 5:30 A.M. to 3:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

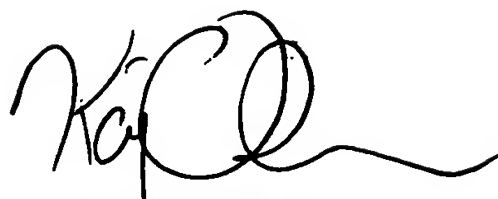
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June 20, 2005

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a long horizontal flourish extending to the right.

KAJ K. OLSEN
PRIMARY EXAMINER